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Serial Number: 09/901,413   Dkt: 884.433US1 (INTEL)
Filing Date: July 9, 2001
Title: REDUCED ALPHABET EQUALIZER USING ITERATIVE EQUALIZATION
Assignee: Intel Corporation

IN THE CLAIMS

Please amend the claims as follows.

1.   (Currently Amended) An equalization system comprising:

a first equalizer to process a communication signal received from a communication channel to generate an output;

a reduced alphabet determination unit to identify a reduced alphabet based on said output of said first equalizer; ~~and~~

a reduced alphabet MLSE equalizer to detect data in said communication signal received from said communication channel based on said reduced alphabet identified by said reduced alphabet determination unit<u>;</u>

<u>the first equalizer generates the output having a subset of symbols with a greater probability of being an actually transmitted as determined from the communication signal; and</u>

<u>the alphabet determination unit generates the reduced alphabet further based on the subset of the symbols provided by the first equalizer.</u>

2.   (Original) The equalization system of claim 1, wherein:

said first equalizer has a length that is less than an anticipated memory length of said communication channel.

3.   (Original) The equalization system of claim 1, wherein:

said first equalizer includes a reduced length MLSE equalizer.

4.   (Original) The equalization system of claim 1, wherein:

said first equalizer includes a delayed decision feedback sequence estimation (DDFSE) equalizer.

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5. (Original) The equalization system of claim 1, wherein:

said first equalizer includes a linear equalizer.

6. (Original) The equalization system of claim 1, wherein:

said first equalizer includes an M-Algorithm equalizer.

7. (Original) The equalization system of claim 1, wherein:

said first equalizer includes an SA(B,C) detector.

8. (Original) The equalization system of claim 1, wherein:

said reduced alphabet MLSE equalizer is a full-state MLSE equalizer.

9. (Original) The equalization system of claim 1, wherein:

said output of said first equalizer includes a plurality of soft symbols each having a corresponding probability, wherein said reduced alphabet determination unit selects the K highest probability soft symbols from said output as said reduced alphabet, where K is a positive integer.

10. (Original) The equalization system of claim 1, wherein:

said output of said first equalizer includes a single symbol, wherein said reduced alphabet determination unit selects K-1 symbols from a full alphabet that are closest in distance to said single symbol as said reduced alphabet, where K is a positive integer greater than 1.

11. (Original) The equalization system of claim 1, wherein:

said reduced alphabet determination unit identifies a reduced alphabet having K symbols, where K is a positive integer, said equalization system further comprising an alphabet length determination unit for determining a value

for K based on an output of said first equalizer.

12.   (Original) The equalization system of claim 11, wherein:

said alphabet length determination unit determines a value for K on an input symbol by input symbol basis.

13.   (Original) The equalization system of claim 11, wherein:

said alphabet length determination unit determines a value for K based on a probability associated with a highest probability soft symbol output by said first equalizer for a particular input symbol.

14.   (Original) The equalization system of claim 11, wherein:

said alphabet length determination unit determines a value for K so that a cumulative probability of the K highest probability soft symbols output by said first equalizer exceeds a threshold value.

15.   (Currently Amended) A method for performing equalization within a communication system, comprising:

first processing a communication signal using a first equalizer;

determining a reduced alphabet based on a result of said first processing; and

second processing said communication signal using a reduced alphabet MLSE equalizer, said reduced alphabet MLSE equalizer operating on said communication signal based on said reduced alphabet;

the first processing including processing the communication signal by the first equalizer to produce a subset of symbols with a greater probability of being an actually transmitted; and

the determining including producing the reduced alphabet based on the subset of the symbols provided by the first equalizer.

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16. (Original) The method of claim 15, wherein:

said first equalizer includes a reduced state MLSE equalizer.

17. (Original) The method of claim 15, wherein:

first processing includes generating a plurality of soft symbols having associated probabilities.

18. (Original) The method of claim 17, wherein:

determining a reduced alphabet includes selecting the K highest probability soft symbols from said plurality of soft symbols as the reduced alphabet, where K is a positive integer.

19. (Original) The method of claim 15, wherein:

first processing includes generating a hard symbol and determining includes selecting the K-1 symbols within a full alphabet that are closest in distance to said hard symbol, where K is a positive integer greater than 1.

20. (Original) The method of claim 15, wherein:

determining a reduced alphabet includes determining an alphabet of size K, where K is a positive integer, said method further comprising redetermining K for successive input symbols within said communication signal.

21. (Original) The method of claim 15, wherein:

second processing includes processing said communication signal in a full-state, reduced alphabet MLSE equalizer.

22. (Currently Amended) A computer readable medium having program instructions stored thereon for implementing, when executed within a digital

processing device, a method for performing equalization within a communication system, said method comprising:

first processing a communication signal using a first equalizer;

determining a reduced alphabet based on a result of said first processing; and

second processing said communication signal using a reduced alphabet MLSE equalizer, said reduced alphabet MLSE equalizer operating on said communication signal based on said reduced alphabet;

the first processing including processing the communication signal by the first equalizer to produce a subset of symbols with a greater probability of being an actually transmitted; and

the determining including producing the reduced alphabet based on the subset of the symbols provided by the first equalizer.

23.   (Original) The computer readable medium of claim 22, wherein:

determining a reduced alphabet includes determining a reduced alphabet for each input symbol within said communication signal.

24.   (Original) The computer readable medium of claim 22, wherein:

determining a reduced alphabet includes determining a reduced alphabet having a size that is related to a symbol probability determined during first processing.

25.   (Original) An equalization system comprising:

a reduced state, full-alphabet MLSE equalizer to process a communication signal received from a communication channel to generate a plurality of soft symbols for a first input symbol within said communication signal, said plurality of soft symbols having corresponding symbol probabilities;

a symbol selection unit to select symbols from said plurality of soft

symbols to form a reduced alphabet for said first input symbol; and

a full-state, reduced alphabet MLSE equalizer to process said communication signal based on said reduced alphabet.

26.   (Original) The equalization system claimed in claim 25, wherein:

said symbol selection unit selects, for said first input symbol, the K highest probability soft symbols output by said reduced state, full-alphabet MLSE equalizer to form said reduced alphabet, where K is an integer greater than 1.

27.   (Original) The equalization system claimed in claim 26, comprising:

an alphabet size determination unit to determine a value for K for each input symbol within said communication signal based on symbol probabilities output by said reduced state, full-alphabet MLSE equalizer.

28.   (Original) A communication device, comprising:

means for receiving a communication signal from a communication channel, said communication signal including undetected input symbols selected from a full symbol alphabet;

means for determining, for individual input symbols within said communication signal, a reduced symbol alphabet having symbols that are more likely to be an actual transmitted symbol than other symbols within said full symbol alphabet; and

a full-state MLSE equalizer for processing said communication signal based on said reduced symbol alphabet.

29.   (Original) The communication device of claim 28, wherein:

said means for determining includes means for dynamically adjusting a

size of said reduced symbol alphabet for successive input symbols within said communication signal.

30.   (Original) The communication device of claim 28, wherein:
       said means for determining includes a reduced complexity equalizer.

Claims 31-33. (Canceled)